

Testing and Analysing 5G Networks

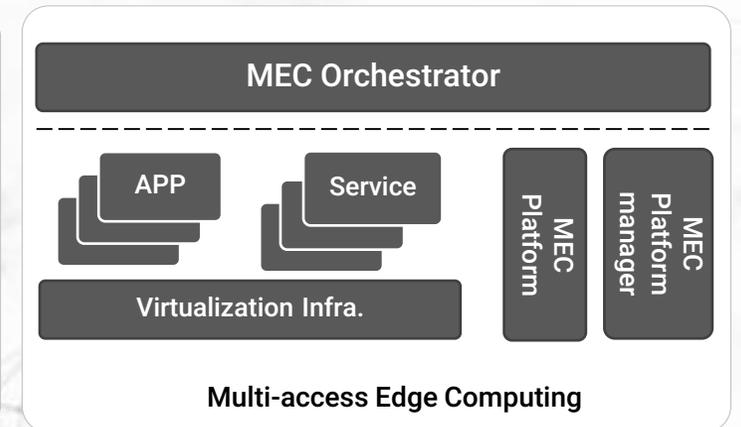
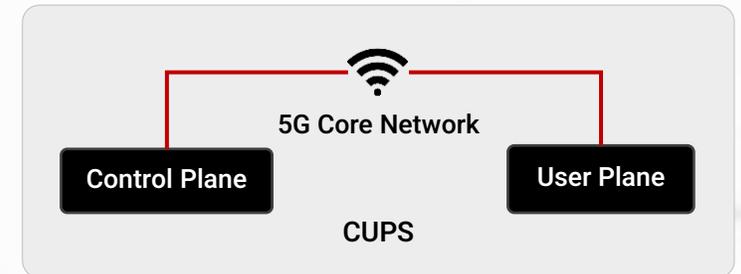
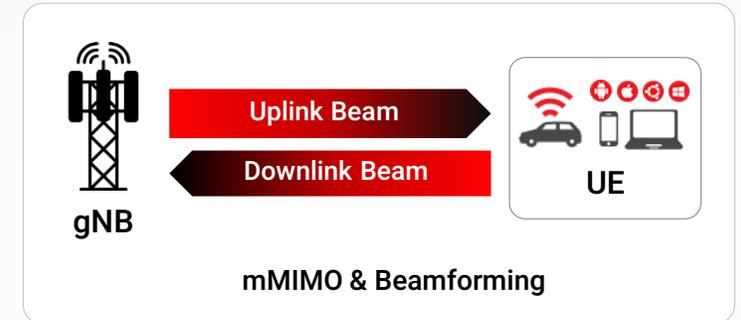
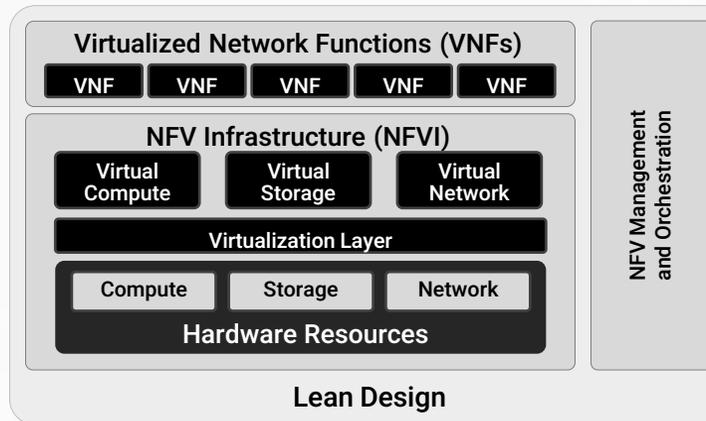
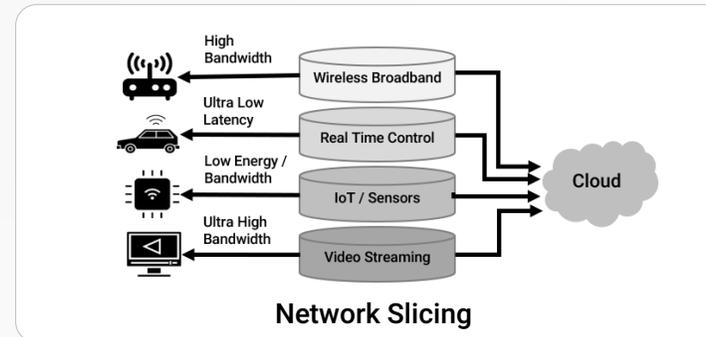
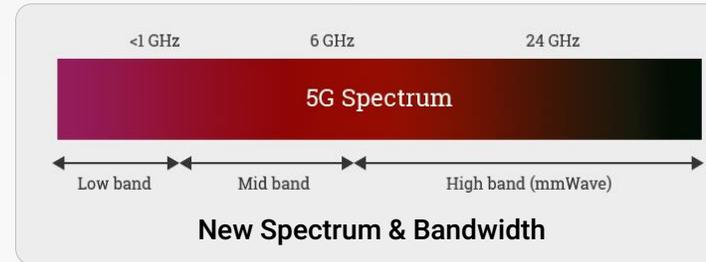


5G

What is 5G and why we need it ?

Driving innovation, competition, and cost effective solutions

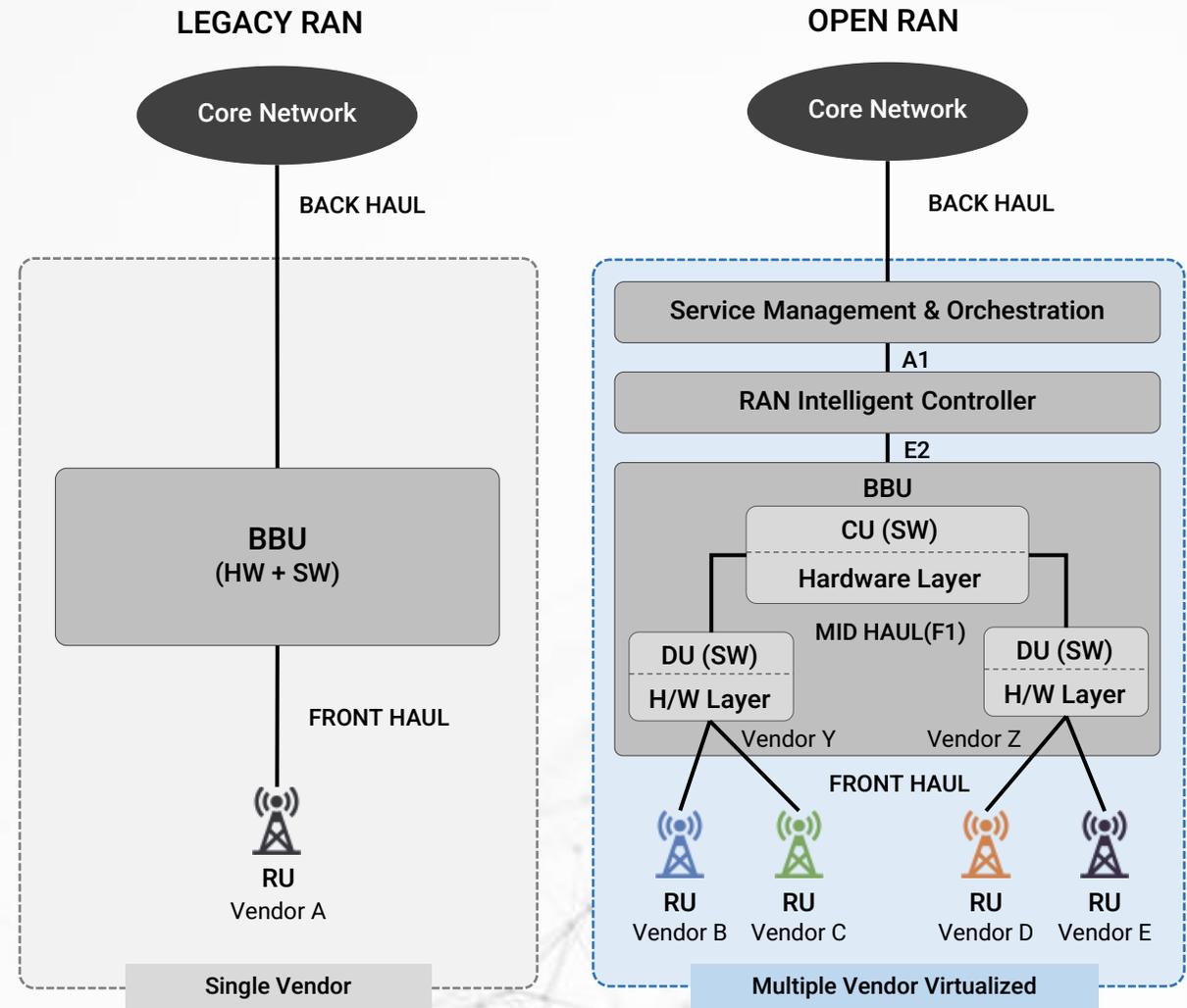
- Amalgamation of various technology
- Differential treatment for different types of network traffic
- Dynamic discovery of network functions
- MEC and PODs providing services, storage, and computing on network edge
- Multi-vendor, software centric network solution
- Cost effective way of creating private 5G core (NPN) - Private 5G



What is O-RAN and its role in 5G ?

- A true separation of the Radio network
- Disaggregation of the Radio Network to split CU and DU functions
- Introduction of Midhaul between CU and DU
- Service Management and Orchestration
- Enabling different Radio technologies to inter-operate
- Optimal utilisation of radio wave
- Uniform security mechanism

Disaggregated radio network enabling multi-vendor solution and driving **cost down**

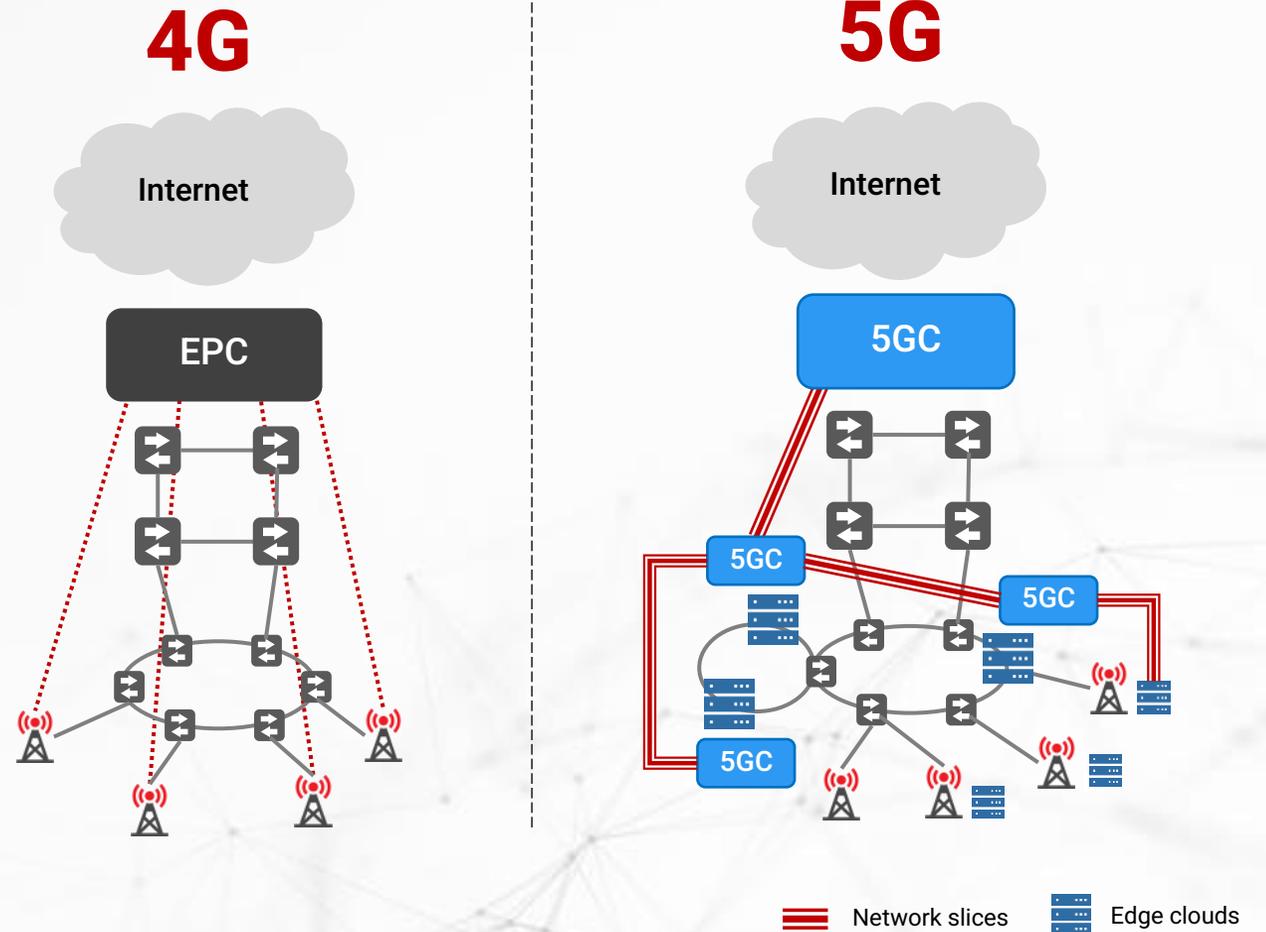


Testing and Analyzing 5G Networks

What's new in 5G:

- End to end complex use cases testing involving various types of NF
- Migration from monolithic node to micro service base NFs
- Emulation and verification of numerous scalable deployment scenarios
- Validation for CUPS, NSA, and SA architecture
- Test for different network slice, node selection, and functionality
- Functional, Conformance, and Performance testing

Multi-vendor NF interoperability, application specific **use cases**, KPI against various **infrastructure**, on-demand **scalability**

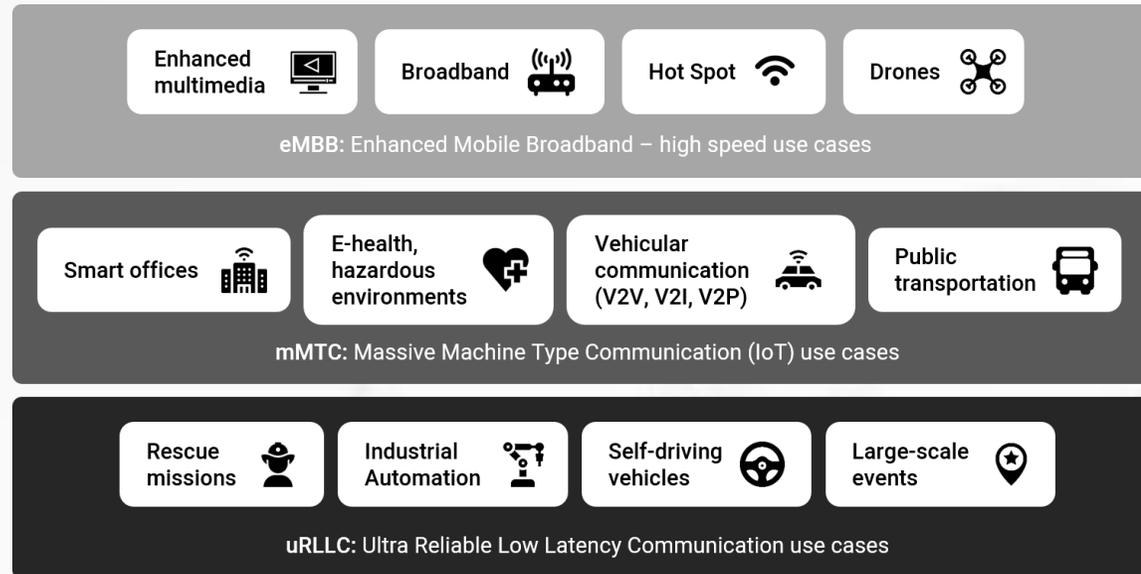


Integration and Testing challenges of 5G Network

Test suites for all **5G use-cases** - **high throughput, sub-millisecond latency, massive connections, and enhanced video services**

What is needed:

- Automated Service assurance and performance monitoring
- Third party API for rapid integration
- Validate both functional and performance over control and data plane.
- Support Dynamic Slice testing against different traffic type
- Ease of adding application functions testing
- Test script mapped to technical specification
- Automated generation of Test Scripts



Enhanced MBB

- 20/10 Gbps DL/UL*
- 4ms user plane latency
- 500km/h mobility

Massive MTC

- 1 million devices/km²
- 10+ years battery life
- 20 dB coverage enhancement

URLLC

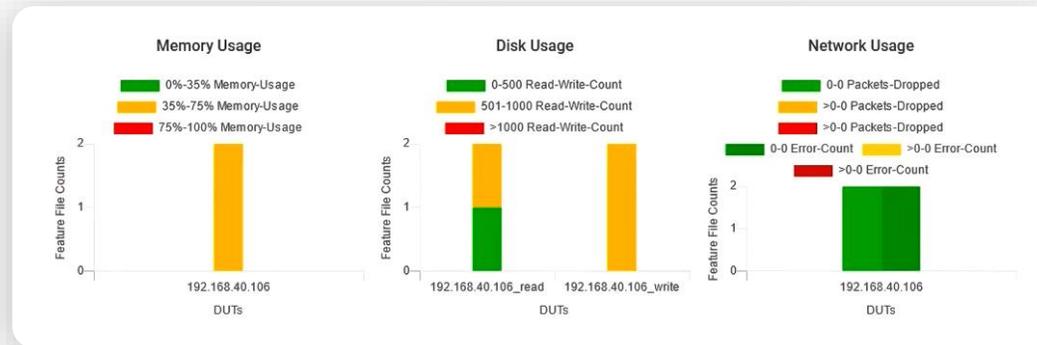
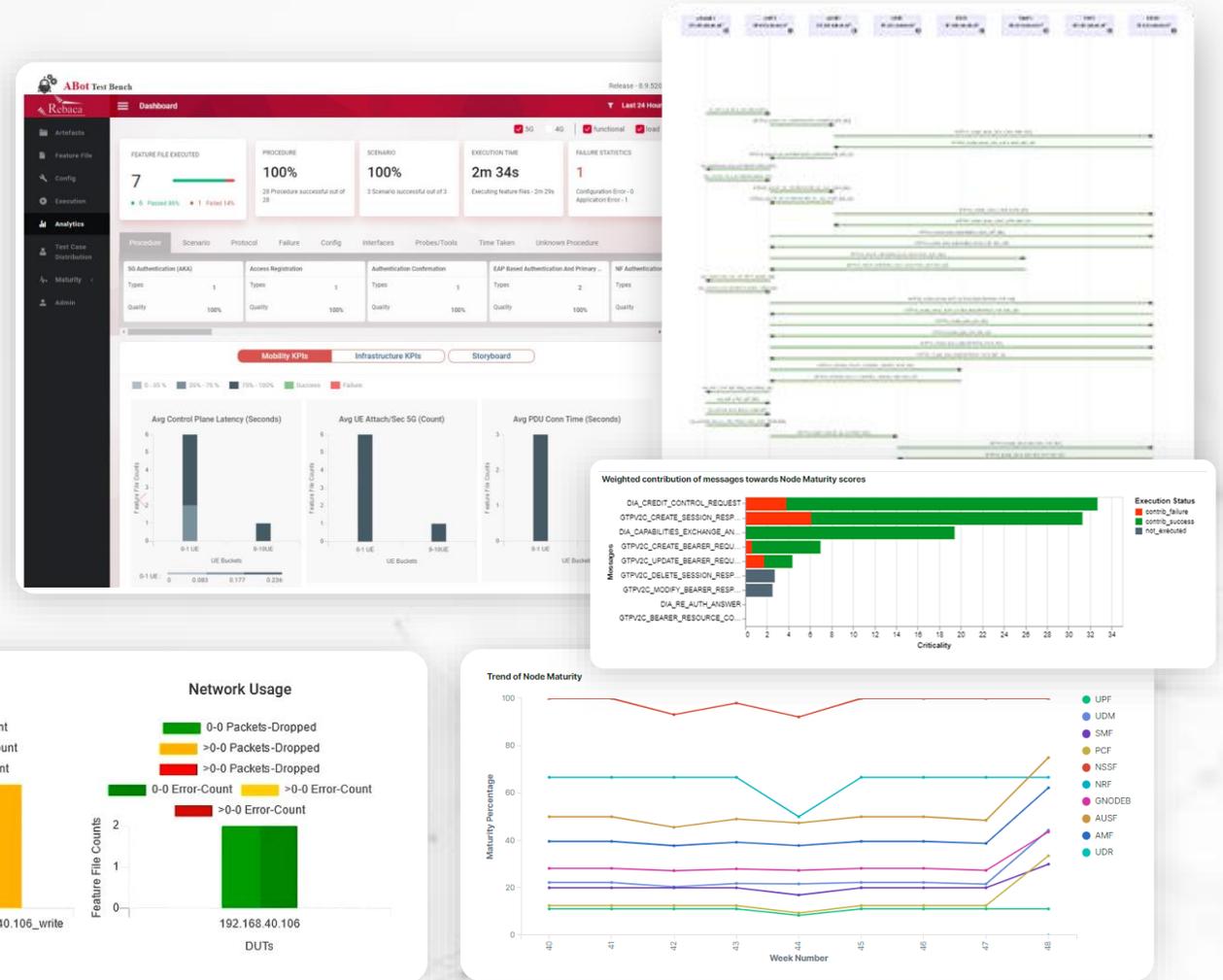
- 1 ms user plane latency
- Highly secure / resilient
- 99.99999% availability
- Peak theoretical rate



Importance of Analytics for 5G Testing, Deployment, and Operation

DevOps based approach with continuous testing, analysis, integration, and deployment

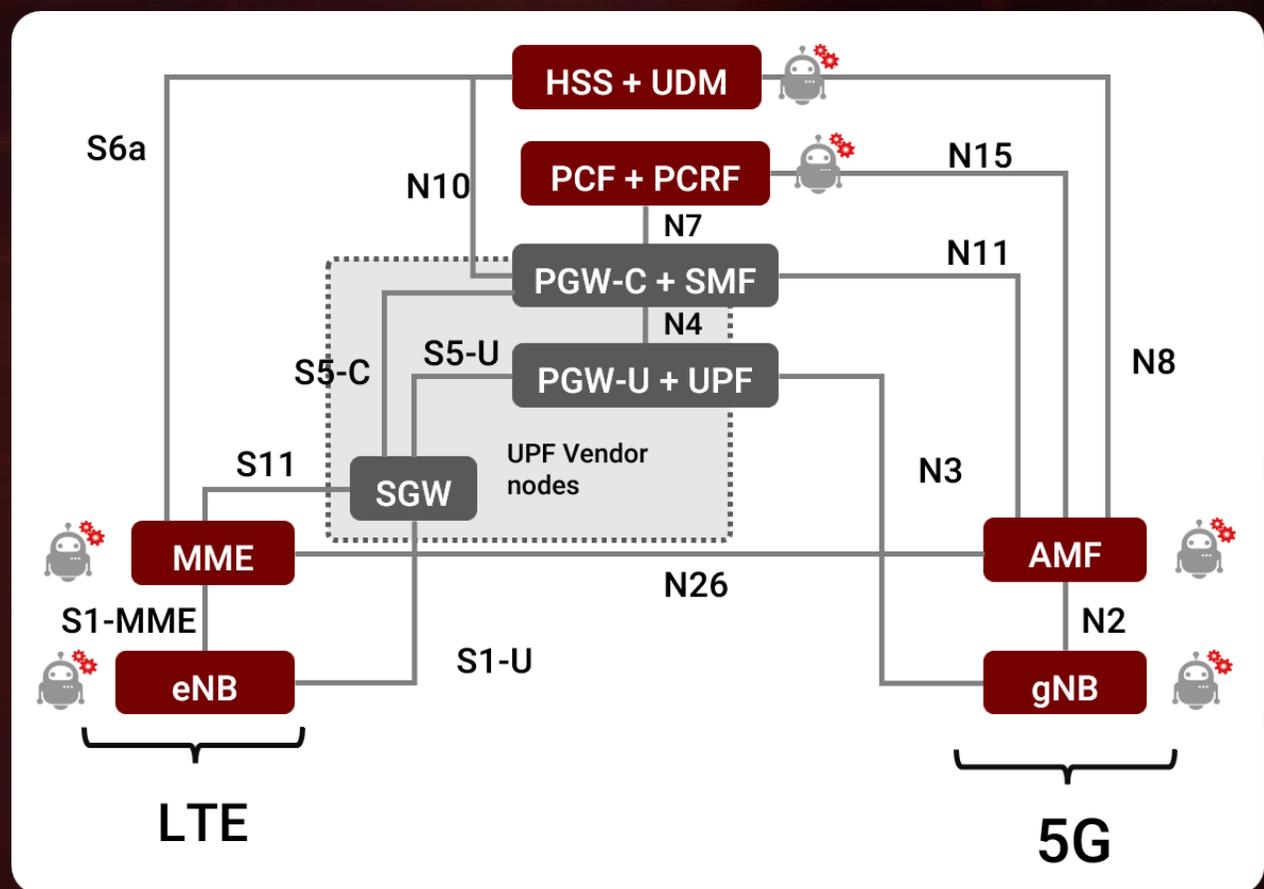
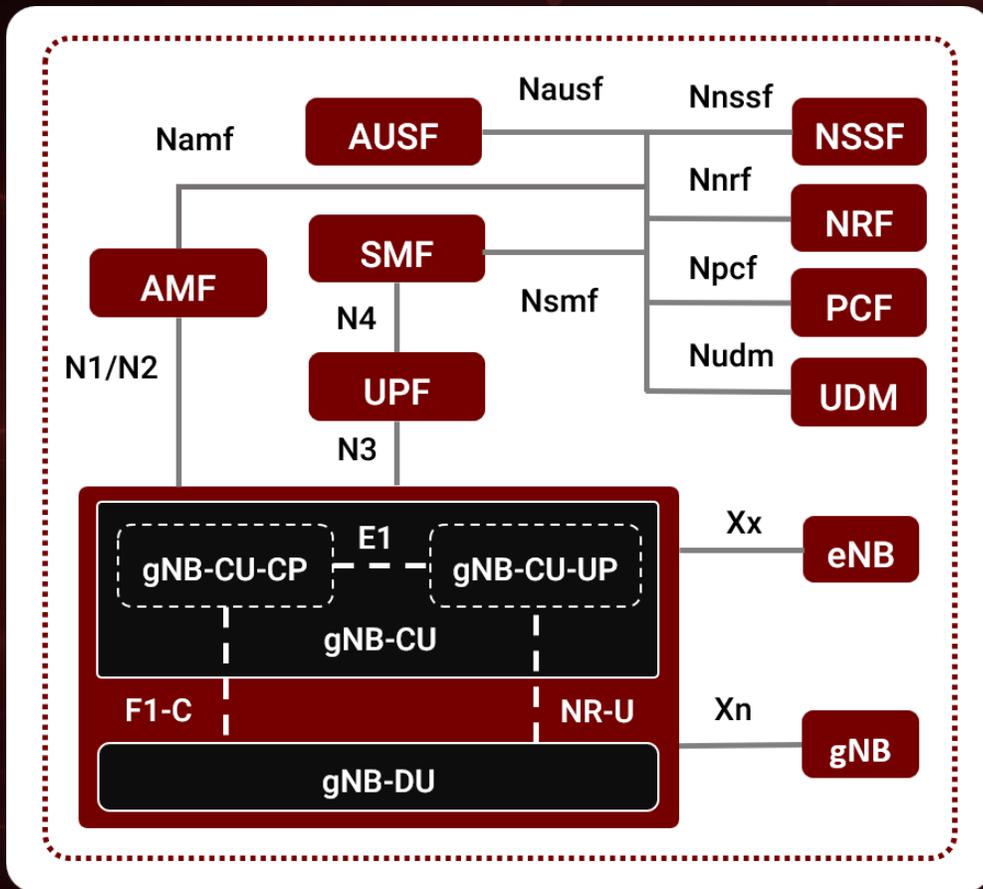
- Understanding the test results with **Root Cause Analysis**
- Deep analysis of **Logs, traces, KPIs**, etc.
- Classify **test authoring error, configuration error or application failure**
- Deriving **System/Infra KPIs** and **Mobility statistics** and analyzing them
- Generating **build analytics**





ABot

**Cloud native 4G/5G and ORAN
Network Protocol Tester**



MEC/Pods compatible Light Weight Protocol Stacks
 for emulating any 4G/5G/ORAN components

High Bandwidth Video Streaming



Max First Buffer Duration
323 ms

Max Total Buffer Duration
312.00 ms

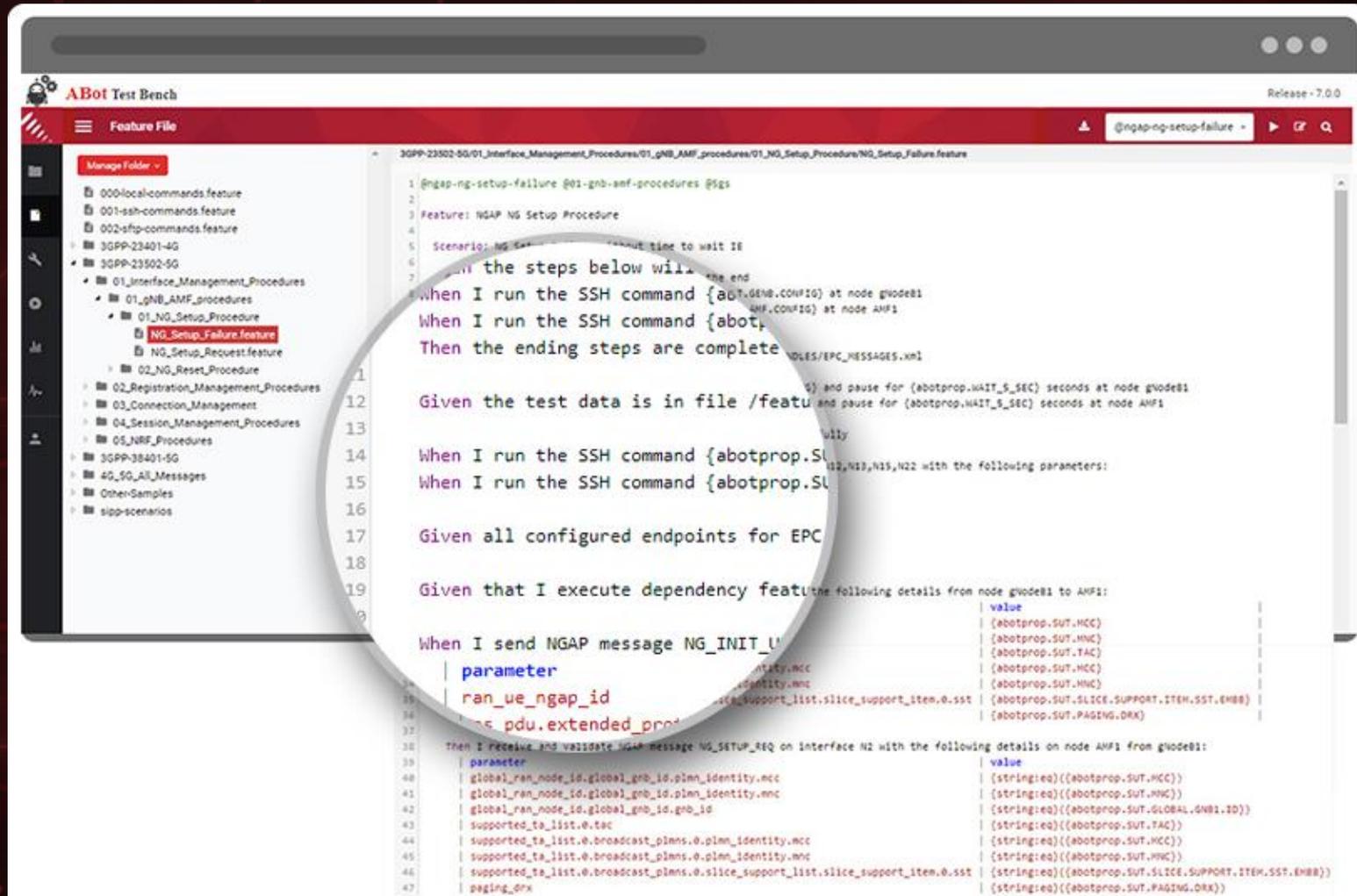
Low Bandwidth Video Streaming



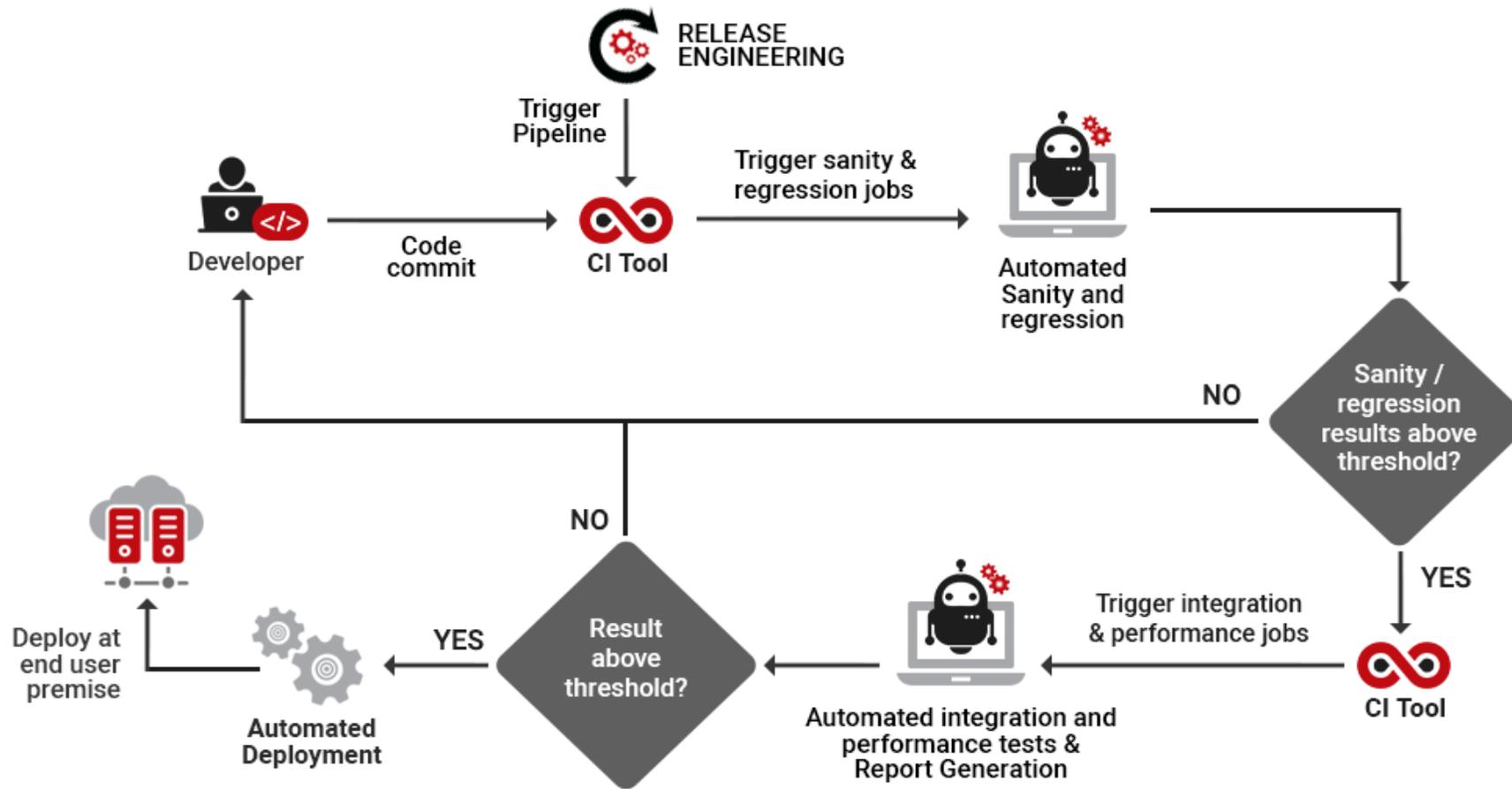
Max First Buffer Duration
184 ms

Max Total Buffer Duration
2.48 s

Traffic characteristics analysis
along with video traffic slicing support

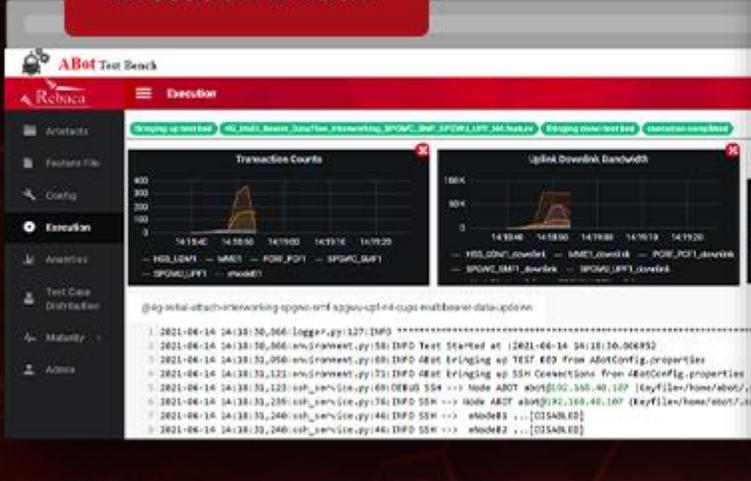


Provides extensive testing coverage on 5G /ORAN with english like test scripts
those are easy to modify , deploy, verify, debug to maintain a network.

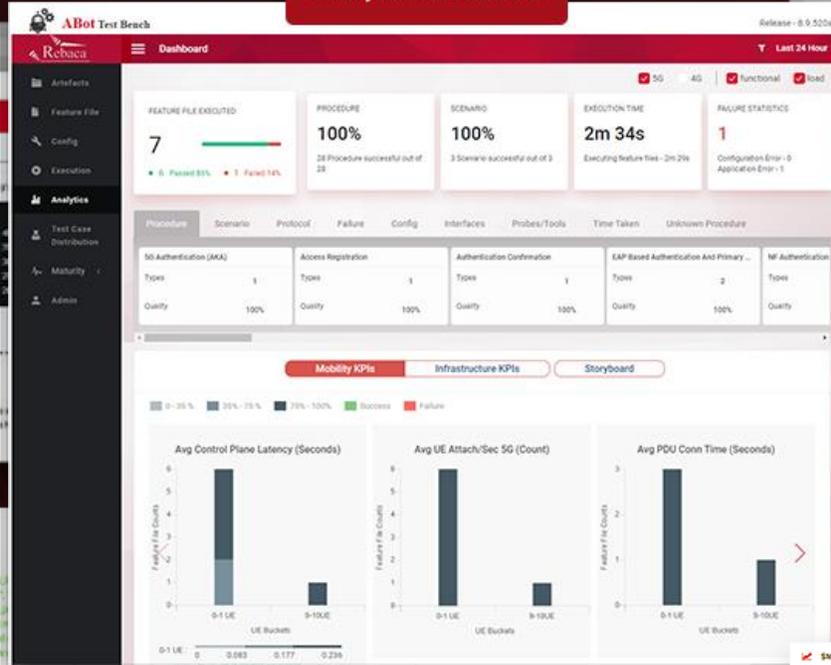


CI/CD Support
for continuous testing, development & integration

Execution Window



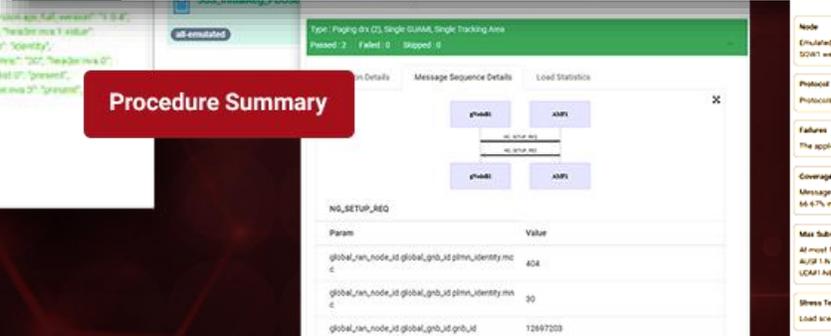
Analytics Dashboard



Log Details



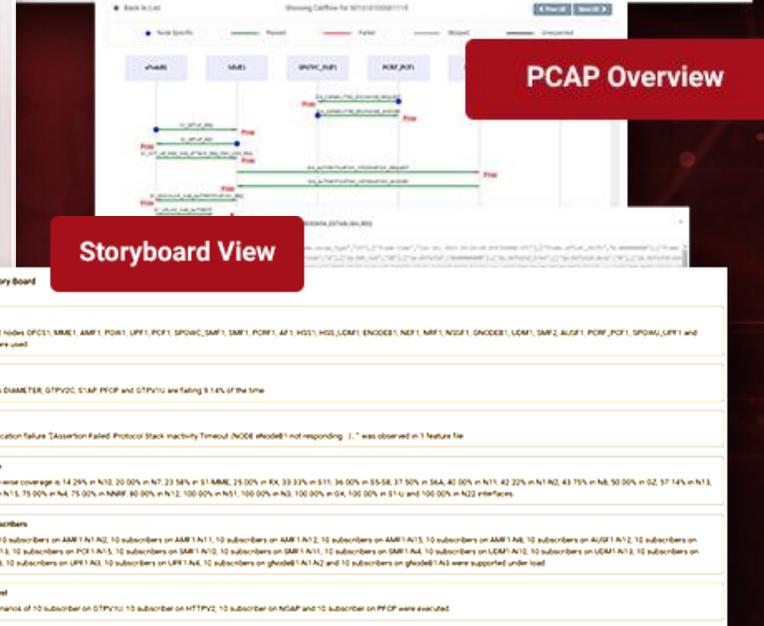
Procedure Summary



PCAP Overview

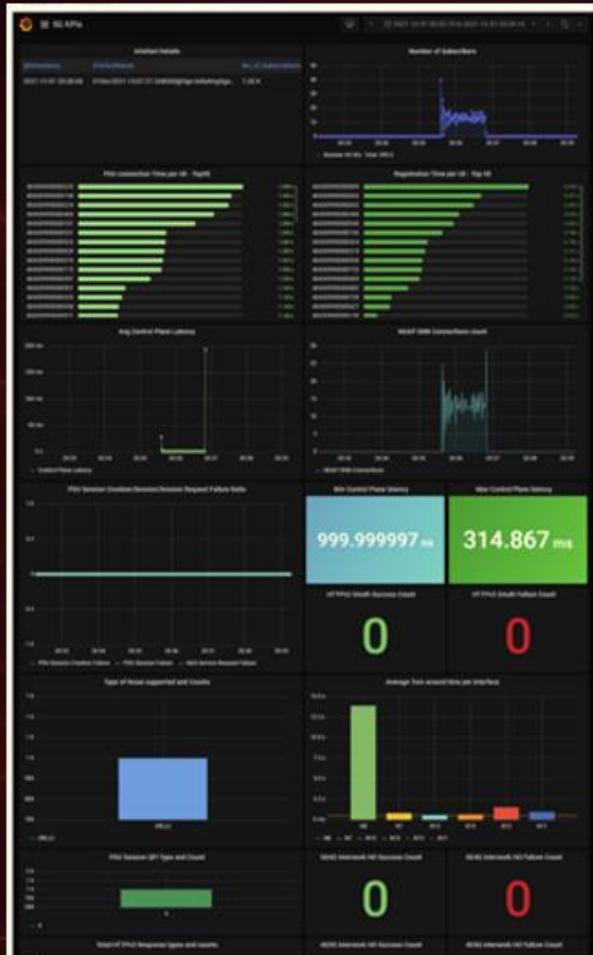


Storyboard View



Study network behavior models against real time production traffic patterns and analyzes the behavior needed for anomaly detection.

Mobility KPI



Infrastructure KPI



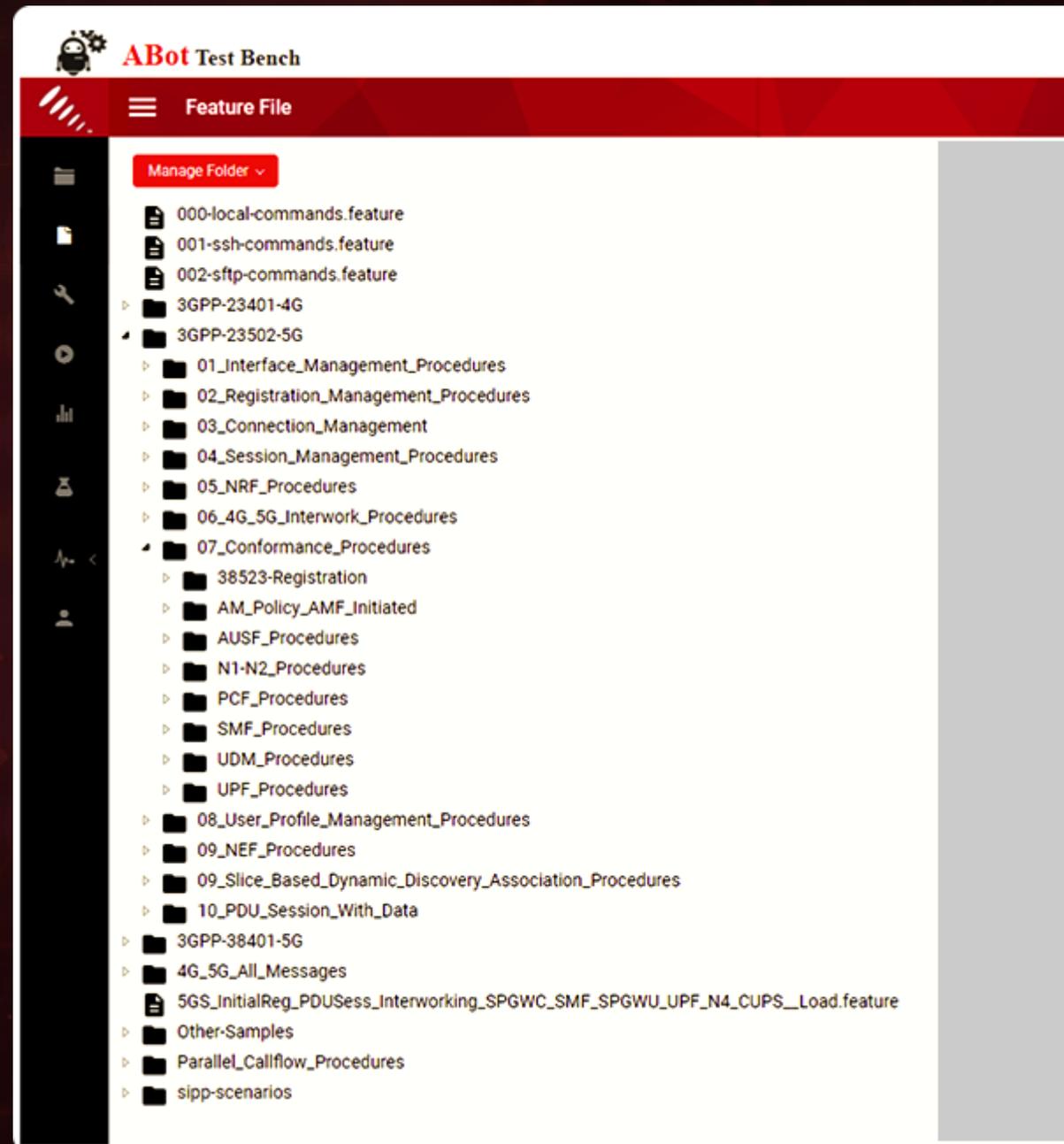
KPI Analysis



Correlation between Network Function performance and its infrastructure/mobility KPIs and provides root-cause analysis for each use.



Plethora of 3GPP Chapter wise
4G/5G/ORAN Test case coverage



The screenshot displays the ABot Test Bench interface. At the top, there is a logo of a robot head with gears and the text "ABot Test Bench". Below the logo is a red navigation bar with a hamburger menu icon and the text "Feature File". On the left side, there is a vertical sidebar with various icons representing different functions like home, search, and settings. The main area shows a file tree structure under the heading "Manage Folder". The tree lists various feature files and folders, including 3GPP-23401-4G, 3GPP-23502-5G, and 3GPP-38401-5G. The 3GPP-23502-5G folder is expanded, showing sub-folders for Interface Management, Registration, Connection Management, Session Management, NRF, 4G/5G Interwork, Conformance, User Profile Management, NEF, Slice Based Dynamic Discovery Association, and PDU Session With Data. The 07_Conformance_Procedures folder is also expanded, listing specific procedures like 38523-Registration, AM_Policy_AMF_Initiated, AUSF_Procedures, N1-N2_Procedures, PCF_Procedures, SMF_Procedures, UDM_Procedures, and UPF_Procedures. Other folders include 08_User_Profile_Management_Procedures, 09_NEF_Procedures, 09_Slice_Based_Dynamic_Discovery_Association_Procedures, 10_PDU_Session_With_Data, 3GPP-38401-5G, 4G_5G_All_Messages, 5GS_InitialReg_PDUSess_Interworking_SPGWC_SMF_SPGWU_UPF_N4_CUPS_Load.feature, Other-Samples, Parallel_Callflow_Procedures, and sipp-scenarios.

- 000-local-commands.feature
- 001-ssh-commands.feature
- 002-sftp-commands.feature
- 3GPP-23401-4G
- 3GPP-23502-5G
 - 01_Interface_Management_Procedures
 - 02_Registration_Management_Procedures
 - 03_Connection_Management
 - 04_Session_Management_Procedures
 - 05_NRF_Procedures
 - 06_4G_5G_Interwork_Procedures
 - 07_Conformance_Procedures
 - 38523-Registration
 - AM_Policy_AMF_Initiated
 - AUSF_Procedures
 - N1-N2_Procedures
 - PCF_Procedures
 - SMF_Procedures
 - UDM_Procedures
 - UPF_Procedures
 - 08_User_Profile_Management_Procedures
 - 09_NEF_Procedures
 - 09_Slice_Based_Dynamic_Discovery_Association_Procedures
 - 10_PDU_Session_With_Data
- 3GPP-38401-5G
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- 5GS_InitialReg_PDUSess_Interworking_SPGWC_SMF_SPGWU_UPF_N4_CUPS_Load.feature
- Other-Samples
- Parallel_Callflow_Procedures
- sipp-scenarios



Thank You

To know more about ABot visit www.rebaca.com